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ABSTRACT

This study was designed to: (1) determine whether there was higher achievement by students assigned homework or by those not assigned homework; (2) determine whether there was higher achievment by students assigned preparation homework or those assigned practice homework; and (3) determine whether there was higher achievement by females or by males within homework groups. The sample consisted of 131 tenth-grade students enrolled in six American History classes. The students were divided into three groups: practice homework, preparation homework, and no homework. Findings indicated that: (1) there was a significant difference in achievement mean scores between students assigned homework and those not assigned homework; (2) there was no statistically significant difference in achievement mean scores between students assigned preparation homework and those assigned practice homework; and (3) there was no statistically significant difference in achievement mean scores between females and males within the homework groups. A discussion of the findings includes a suggestion that homework assignments must be regularly assigned, clearly stated, regularly collected, promptly graded, and promptly returned. (JD)

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Homework in the classroom:
Can it make a difference in student achievement?

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Homework is a daily event in the lives of students and teachers. A national report called for more homework (National Commission, 1983). Can homework make a difference in student achievement? Which type of homework increases student achievement?

Background

Controversy over the positive and negative effects of homework occurred as early as 1842 in England (Gordon, 1980). An early edition of the Cyclopaedia of Education indicated that children under nine years of age could not prepare new work at home and should not be given any home-lessons ("Home-Lessons", 1892). As a result of the early controversy over homework, experimental research on homework began in 1904 in Germany (Simmons, 1921). The popular press became concerned about the topic in 1913 when Ladies' Home Journal conducted a survey of administrators, medical doctors, and parents about the effects of homework on children. The article stated a desire for no more homework in the public schools ("The first step", 1913). The homework debate has ebbed and flowed ever since that time. Goldstein (1960) examined 17 experimental research reports from the thirty years preceding 1959. Goldstein concluded that results were mixed due to limited and inadequate studies, but that experimental data supported achievement gains due to homework. Leonard (1965) found that planned, systematic, instructional homework procedures produced positive achievement results. Friesen (1979) reviewed 24 homework-versus-no-homework studies that were conducted between 1923 and 1976 and found no clear-cut endorsement for either homework or no homework. Coulter (1980) examined the homework literature and concluded that certain kinds of regularly assigned homework affected school achievement, however, "fifty years of research on homework have yielded little information that might guide teachers or administrators in setting policy or in adopting strategies that will maximize pupil participation and achievement" (p. 26). Knorr (1981) concluded that the question of the relationship of homework to achievement remained unresolved. Rickards (1982) stated "I am reasonably sure that homework of the right kind given under the right set of conditions positively influences academic achievement. What is needed is more well-designed and well-executed experimental research aimed at systematically examining different kinds of homework under different sorts of conditions" (p. 833). Strother (1984) summarized homework findings by stating that "research does not tell us what kind of homework works best for what kind of learner. We do have some insights into the kinds of homework that teachers can assign, however" (p. 425).

In searching for the right type of homework, the current researchers found 84 experiments that were conducted between 1904 and 1984 and that dealt with some aspect of homework (Foyle, 1984). As a result of the educational response to Sputnik I in October 1957, experimental research on homework increased. Prior

to Sputnik there were 18 homework experiments. After Sputnik there were 66 homework experiments (Foyle, 1984). Homework experiments can be divided into three categories: positive results, negative results, and neutral results or no difference between treatments. Also, the experiments can be divided into educational levels: elementary, high school, and college. Homework results were mixed. Thirty-four experiments found positive results for homework over other methods of learning. Six experiments found homework produced negative effects when compared to other methods of learning. Forty-eight experiments found that homework and other methods of learning produced similar results in student achievement. The number of results (88) is greater than the actual number of experiments (84) due to multiple conclusions in one experiment and multiple grade levels in another experiment (Foyle, 1984). The results of these 84 experiments are found in Table 1.

Insert Table 1 about here

The current researchers found that some subjects, such as mathematics, were the primary area for homework experimentation (Austin, 1979). Since 1957, fifty-nine out of sixty-five cited homework experiments were conducted in mathematics, mathematics-related subjects, and shorthand. Teachers must continue to deal with homework, however, which type of homework increases student achievement?

The Problem

The current researchers noted that various homework experiments dealt with differing types of homework. Was the problem of mixed results in terms of homework and student achievement related to the use of differing types of homework in the experimental process? Which type of homework increases student achievement? Lee and Pruitt (1979) observed that various kinds of homework fell into four categories. They proposed a taxonomy of homework which involved four types of homework: (1) preparation homework, (2) practice homework, (3) extension homework, and (4) creativity homework.

The current researchers found no experiments that were conducted using Lee and Pruitt's homework taxonomy. Hence, on the basis of other homework researchers' findings, our review of the literature, and Lee & Pruitt's taxonomy, the current researchers conducted a homework experiment in order to ascertain which type of homework produces student achievement in social studies.

The current researchers chose to examine two parts of Lee & Pruitt's homework taxonomy: preparation homework and practice homework. Preparation homework may act as an "advance organizer" for the teacher's lesson. Likewise, the teacher's lesson may act as an "advance organizer" for the practice homework (Ausubel, 1968). This study was designed (a) to determine whether there was higher achievement by students who were assigned homework or by students who were not assigned homework, (b) to determine whether there was higher achievement by students who were assigned preparation homework or by students who were assigned practice

homework, and (c) to determine whether there was higher achievement by females or by males within homework groups.

Definition of terms

Homework was defined as the taking of books and assignments home after school for the purpose of home study (Crawford & Carmichael, 1937). Experience taught the current researchers that Lee and Pruitt's (1979) taxonomy of homework, substantiated by LaConte (1981), covered the types of homework that social studies teachers assigned to students. Practice homework was defined as factual responses to terms and questions that covered material already presented in class during that class period. Practice homework was given to the students after the class lesson in order to reinforce that lesson. Preparation homework was defined as factual responses to terms and questions that would be covered in class. Preparation homework was given to students before the class lesson so that students would gain maximum benefit from the lesson. Thus, practice homework came after the lesson and preparation homework came before the same lesson with both types of homework consisting of identical terms and questions.

The Sample

The sample consisted of 131 students enrolled at Emporia High School, Emporia, Kansas. During the fall semester of the 1983-84 school year, these students were in six intact classes of tenth-grade American History. The total population of Emporia High School on September 15, 1983 was 1,181 students in grades nine through twelve. There were 349 freshmen, 285 sophomores, 255 juniors, 254 seniors, and 38 special education students. The 131 student sample was divided into three treatment groups: (1) the preparation homework group, (2) the practice homework group, and (3) the no-homework group or control group. A profile of the students in the sample is found in Table 2.

Insert Table 2 about here

Limitations

The experiment took place in a public school under normal teaching conditions. One teacher taught five class sections of American history and another teacher taught one class section of American history. No other American history sections were scheduled during the semester since one section of American history was offerred during each of the six periods of the school day. Class presentations, course content outlines, and the amounts of time spent on the content topics during class were held as constant as possible since homework was the variable under study. The study was limited to two types of Lee & Pruitt's taxonomy of homework (1) practice homework, and (2) preparation homework.

Procedures

The design utilized in this research was the nonequivalent control group design as described by Campbell and Stanley (1966). Students were assembled together in classrooms. Although the sampling procedure was not a random procedure, the assignment of

treatment and control groups was under the experimenters' control. The six American History classes were randomly assigned to three treatment groups: (1) preparation homework group, (2) practice homework group, (3) no-homework group or control group. Two teachers taught a six-week unit of study called "United States' Domestic and Foreign Politics: 1865-1932".

During the experiment, class presentations were identical for the three treatment groups. Each class period during the school day had identical lessons. The teachers assigned identical written homework to the preparation and practice homework groups. The teachers assigned preparation homework before the class presentation and practice homework after the class presentation. The researchers did not assign homework to the no-homework group. All homework was assigned during the last five minutes of class in order to prevent students from completing homework during the class period. The assignments were designed to take about thirty minutes three to five times per week. Identical homework assignment sheets were used for the preparation homework treatment group and the practice homework treatment group. The homework was clearly stated on the homework assignment sheets and handed to the students. Homework was completed on these sheets and collected the day after assignment. One day later, the graded homework sheets were returned to the students. Hence, the homework was regularly assigned, clearly stated, regularly collected, promptly graded, and promptly returned.

The researchers administered two instruments: the Differential Aptitude Test, Verbal Reasoning subtest, Form T, (DAT) and a teacher-made multiple-choice social studies test. A pretest and posttest consisted of the teacher-made multiple-choice social studies test. The DAT's validity at the tenth-grade level was $\underline{r}$=.52 for girls and $\underline{r}$=.48 for boys and reliability was .96 for girls and .95 for boys. The multiple-choice test validity was determined by comparing test items to the social studies department test file for the teaching unit as it had been previously taught and tested. Reliability was determined by using the Kuder-Richardson formula 21 (KR 21). Pretest reliability was .64 with a standard error of 3.08. Posttest reliability was .87 with a standard error of 3.07.

Findings

The investigators analyzed the data by using an analysis of covariance (Nie, 1975). Statistical comparisons were made at the .05 level of significance. This procedure was used to ascertain the significant difference among the achievement mean scores of the three treatment groups and between achievement mean scores of the female and male students within groups. The analysis of covariance is found in Table 3.

Insert Table 3 about here

The researchers computed a Multiple Classification Analysis (Nie, 1975) in order to obtain the adjusted group means that were adjusted by the covariates. The adjusted group means were as follows: (a) 28.48 for the preparation homework group, (b) 27.63

for the practice homework group, and (c) 22.81 for the no-homework group. The researchers used the student pretest scores and ability scores (DAT) as covariates in order to equate groups that contained students who were not randomly assigned to the groups. The Multiple Classification Analysis is found in Table 4.

Insert Table 4 about here

The researchers calculated Tukey's Honestly Significant Difference test (Tukey's HSD) for post hoc multiple comparisons among group means (Hinkle, 1979). This procedure was used to ascertain which group means differed significantly from each other. Tukey's HSD post hoc multiple comparison test used these three adjusted group means in order to determine which group means significantly differed from each other. Tukey's HSD found a significant difference (.05) between the preparation homework group (28.48) and the no-homework group (22.81). Tukey's HSD found a significant difference (.05) between the practice homework group (27.63) and the no-homework group (22.81). Tukey's HSD found no significant difference (.05) between the preparation homework group (28.48) and the practice homework group (27.63).

Results

1. There was a statistically significant difference (.05) in achievement mean scores between students who were assigned homework and students who were not assigned homework. Homework which is regularly assigned, clearly stated, regularly collected, promptly graded, and promptly returned increases student achievement when compared to students who were not assigned homework.

2. There was no statistically significant difference (.05) in achievement mean scores between students who were assigned preparation homework and students who were assigned practice homework. Either preparation homework or practice homework can be assigned to students. Both types of homework raise student achievement when compared to students who were not assigned homework.

3. There was no statistically significant difference (.05) in achievement mean scores between females and males within homework groups. Females and males achieve the same regardless of the type of homework assigned to them. There are no gender differences.

Implications

Teachers should continue to assign homework without regard to student gender. However, homework assignments must be regularly assigned, clearly stated, regularly collected, promptly graded, and promptly returned.

Teachers can assign preparation homework or practice homework on the basis of their goals in the subject matter and of their personal preferences and teaching styles. The teachers need to decide whether the classroom lesson will be better understood if prepared for in advance by the student (preparation homework), or whether the classroom lesson would clarify the homework assignment

(practice homework). Teachers have a solid foundation in using two of Lee & Pruitt's types of homework: (1) preparation homework, and (2) practice homework.

Homework does make a difference in student achievement. However, which type of homework produces student achievement? Student achievement is produced by either preparation homework or practice homework.

TABLE 1

Homework Experiments

By level, occurrence and results

Results	Elementary		High School		College	
	1904-57	1958-84	1904-57	1958-84	1904-57	1958-84
Positive	4	13	3	6	0	8
Neutral	3	9	4	7	0	25
Negative	4	0	2	0	0	0
Total	11	22	9	13	0	33

Two experiments contained both elementary and high school grade levels. One high school experiment found positive, negative, and neutral results reported in three subject areas. (Foyle, 1984)

TABLE 2

Profile of Students

by Gender and Homework Group

Group	n	Percent	Male	Percent	Female	Percent
Preparation	43	32.8	21	48.8	22	51.2
Practice	50	38.2	38	76.0	12	24.0
No-homework	38	29.0	16	42.1	22	57.9
Total	131	100.0	75	57.3	56	42.7

TABLE 3

Analysis of Covariance

Posttest Scores by Gender and Homework Group

with Pretest Scores and DAT Scores

Sources of Variation	df	Sums of Squares	Mean Squares	F Ratio	F Probability
Covariates	2	2964.71	1482.36	32.95	0.001
Pretest	1	2760.03	2760.03	61.35	0.001
DAT	1	204.68	204.68	4.55	0.035
Main Effects	3	710.30	236.77	5.26	0.002
Gender	1	7.52	7.52	0.17	0.683
Homework	2	702.78	351.39	7.81	0.001
2-Way Inter. Gender x Homework	2	7.68	3.84	0.09	0.918
Explained	7	3682.70	526.10	11.69	0.001
Residual	123	5533.91	44.99		
Total	130	9216.60	70.90		

Covariate Raw Regression Coefficient

Pretest = .938

DAT = .157.

TABLE 4

Multiple Classification Analysis

Posttest Scores by Gender and Homework Group

with Pretest Scores and DAT Scores

Variable/Level	n	Unadjusted Dev'n	Unadjusted Eta	Adjusted Dev'n	Adjusted Beta
Gender					
1 Male	75	0.34		-0.50	
2 Female	56	-0.46		0.66	
			0.05		0.07
Homework					
1 Preparation	43	2.95		1.97	
2 Practice	50	1.09		1.12	
3 No-homework	38	-4.77		-3.70	
			0.38		0.29

Grand Mean = 26.51

Multiple R = 0.631

Multiple R Squared = 0.399

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